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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/788,656	02/27/2004	Yingjian Chen	K35R1897	7261

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EXAMINER

WATKO, JULIE ANNE

ART UNIT

PAPER NUMBER

2627

DATE MAILED: 08/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/788,656

Applicant(s)

CHEN ET AL.

Examiner

Julie Anne Watko

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 11-20, 23-32 and 35-39 is/are rejected.
- 7) ☒ Claim(s) 9, 10, 21, 22, 33 and 34 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Drawings

1. The drawings are objected to because the axis label in Fig. 3 is not clearly legible, as the words and the numbers overlap. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Double Patenting

2. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The

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filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

3. Applicant is advised that should claim 25 be found allowable, claim 39 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. Applicant is advised that should claim 37 be found allowable, claim 38 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

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claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-8, 11-20, 23-32 and 35-39 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ooshima (US PAP No. 20030030947 A1).

As recited in claim 1, Ooshima shows a magnetic sensor comprising: an antiferromagnetic layer 26 extending in a track-width direction, a ferromagnetic layer 27 disposed over the antiferromagnetic layer, the ferromagnetic layer having a magnetization that remains substantially fixed in response to an applied magnetic field ("pinned", see ¶ 0098) and extending in the track-width direction to terminate in a first end 20a; a magnetically soft layer 29 disposed over the ferromagnetic layer, the magnetically soft layer having a magnetization that rotates in response to the applied magnetic field ("free", see ¶ 0101), the magnetically soft layer extending in the track-width direction to terminate in a second end, the first and second ends forming part of a junction; a cap layer 30 disposed over the magnetically soft layer, a magnetically hard layer disposed adjacent to at least the second end, the magnetically hard layer having a magnetization that remains substantially fixed in response to the applied magnetic field, to stabilize the magnetization of the end of the magnetically soft layer; and an underlayer disposed between the antiferromagnetic layer and the magnetically hard layer.

As recited in claim 1, Ooshima are silent regarding whether the junction has a slope of less than forty-five degrees when measured at a location seven nanometers below a top of the cap layer; however, as the figures of Ooshima are not indicated as being to scale, it is possible that the apparatus disclosed by Ooshima meets the claimed dimensional limitations.

Even if the apparatus disclosed by Ooshima did not meet the claimed dimensional limitations, it would have been obvious to arrive at the claimed dimensions through the process of routine experimentation and optimization in the absence of criticality. Gardner v. TEC systems, Inc., 220 USPQ 777 (Fed. Cir. 1984). Applicant has failed to show unexpected results due to the claimed dimensions.

Regarding claims 2-3, 7 and 12: See rationale regarding dimensional limitations above for claim 1.

As recited in claims 4, 16 and 28, Ooshima shows that the underlayer includes an amorphous layer 32 and a crystalline layer 33.

As recited in claims 5, 17 and 29, Ooshima shows that the underlayer includes an electrically conductive amorphous layer 32 (“amorphous conductive layer”, see ¶ 0139) and a crystalline layer 33.

As recited in claims 6, 18 and 30, Ooshima shows that the underlayer includes an electrically insulating amorphous layer (Al_2O_3 , see ¶ 0139) and a crystalline layer 33.

As recited in claims 8, 20 and 32, Ooshima shows electrically conductive, nonmagnetic layer 28 disposed between the ferromagnetic layer 27 and the magnetically soft layer 29.

As recited in claims 11, 23 and 35, Ooshima shows a magnetically soft shield 21, and an electrically insulating read gap layer 22 adjoining the magnetically soft shield and the antiferromagnetic layer, wherein the read gap layer has a uniform thickness (see Fig. 1).

As recited in claim 13, Ooshima shows a magnetic sensor comprising: an antiferromagnetic layer 26 extending a first distance in a track-width direction; a ferromagnetic layer 27 disposed over the antiferromagnetic layer, the ferromagnetic layer having a magnetization that remains substantially fixed in response to an applied magnetic field (“pinned”, see ¶ 0098); a magnetically soft layer 29 disposed over the ferromagnetic layer, the magnetically soft layer having a magnetization that rotates in response to the applied magnetic field (“free”, see ¶ 0101), the magnetically soft layer extending a second distance in the track-width direction, a magnetically hard layer 34 disposed adjacent to an end of the magnetically soft layer, the magnetically hard layer having a magnetization that remains substantially fixed in response to the applied magnetic field, to stabilize the magnetization of the end of the magnetically soft layer 29; and an underlayer (including 32 and 33) disposed between the antiferromagnetic layer 26 and the magnetically hard layer 34.

As recited in claim 13, Ooshima is silent regarding the second distance being not more than half the first distance; however, as the figures of Ooshima are not indicated as being to scale, it is possible that the apparatus disclosed by Ooshima meets the claimed dimensional limitations.

Even if the apparatus disclosed by Ooshima did not meet the claimed dimensional limitations, it would have been obvious to arrive at the claimed dimensions through the process of routine experimentation and optimization in the absence of criticality. *Gardner v. TEC*

systems, Inc., 220 USPQ 777 (Fed. Cir. 1984). Applicant has failed to show unexpected results due to the claimed dimensions.

As recited in claims 14 and 26, Ooshima shows that the underlayer has a thickness that substantially aligns the magnetically hard layer and the magnetically soft layer (see ¶ 0112).

Regarding claims 15, 19 and 24: See rationale regarding dimensional limitations above for claim 13.

As recited in claims 25 and 39, Ooshima shows a magnetic sensor comprising: an antiferromagnetic layer 26 extending in a track-width direction; a ferromagnetic layer 27 disposed over the antiferromagnetic layer, the ferromagnetic layer having a magnetization that remains substantially fixed (“pinned”, see ¶ 0098) in response to an applied magnetic field and extending in the track-width direction; a magnetically soft layer 29 disposed over the ferromagnetic layer, the magnetically soft layer having a magnetization that rotates in response to the applied magnetic field (“free”, see ¶ 0101), the magnetically soft layer extending in the track-width direction to terminate in an end 20a; a magnetically hard layer disposed adjacent to the end, the magnetically hard layer having a magnetization that remains substantially fixed in response to the applied magnetic field, to stabilize the magnetization of the end of the magnetically soft layer; and an underlayer disposed between the antiferromagnetic layer and the magnetically hard layer.

As recited in claim 25, Ooshima is silent regarding whether the antiferromagnetic layer, ferromagnetic layer and magnetically soft layer form a stack having a thickness that is less than an amount that the antiferromagnetic layer extends in the track-width direction beyond the end;

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however, as the figures of Ooshima are not indicated as being to scale, it is possible that the apparatus disclosed by Ooshima meets the claimed dimensional limitations.

Even if the apparatus disclosed by Ooshima did not meet the claimed dimensional limitations, it would have been obvious to arrive at the claimed dimensions through the process of routine experimentation and optimization in the absence of criticality. Gardner v. TEC systems, Inc., 220 USPQ 777 (Fed. Cir. 1984). Applicant has failed to show unexpected results due to the claimed dimensions.

Regarding claims 27, 31 and 36: See rationale regarding dimensional limitations above for claim 25.

As recited in claims 37-38, Ooshima shows a magnetic sensor comprising: an antiferromagnetic layer 26 extending a first distance in a track-width direction; a ferromagnetic pinned layer 27 disposed over the antiferromagnetic layer; a ferromagnetic free layer 29 disposed over the pinned ferromagnetic layer, the free layer having a magnetization that rotates due to an applied magnetic field, the free layer extending a second distance between two ends 20a in the track-width direction, a pair of magnetically hard bias layers 34, each bias layer disposed adjacent to a different one of the ends 20a and providing a magnetic field to stabilize the magnetization of the adjacent end; and a pair of underlayers (each underlayer including 32 and 33), each underlayer disposed adjacent to a different one of the hard bias layers 34 to increase alignment between the adjacent bias layer 34 and the free layer 29 (see ¶ 0112).

As recited in claims 37-38, Ooshima is silent regarding the second distance being not more than half the first distance.

Allowable Subject Matter

8. Claims 9-10, 21-22 and 33-34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Chien et al (US Pat. No. 6668443 B2) show a bottom spin valve recording head wherein degradation of a hard longitudinal bias is prevented from degrading by insertion of layers 66 and 42-43 between antiferromagnetic layer 36 and longitudinal bias layer 41.

Saito et al (US PAP No. 20030011947 A1) show a spin-valve thin film magnetic head comprising Cr layer 31 between CoPt layer 32 and antiferromagnetic layer 13.

Hasegawa (US Pat. No. 6760200 B2) shows a spin-valve magnetic element wherein "hard bias layers 6B are disposed at the same level as that of the free magnetic layer 5" (see col. 50, lines 20-21).

10. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

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like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julie Anne Watko whose telephone number is (571) 272-7597.

The examiner can normally be reached on Monday through Thursday, noon to 10PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dwayne D. Bost can be reached on (571) 272-7023. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Julie Anne Watko, J.D.
Primary Examiner
Art Unit 2627

August 16, 2006
JAW

A handwritten signature in black ink, appearing to read 'Julie Anne Watko', with a large, stylized loop at the end.